**METRIC**

01 August 2011

# GENERAL SPECIFICATION
# FOR
# NON STANDARD SHOULDER FIRED & SPIN STABILIZED
# GRENADE AMMUNITION

## 1. SCOPE

1.1 Scope. This specification prescribes the performance requirements and identifies the verification procedures for the Non-Standard Shoulder Fired and Spin Stabilized Grenade Ammunition.

## 2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in section 5 of this specification. This section does not include documents cited in other sections of this specification or recommended for additional information or as examples. While every effort has been made to ensure the completeness of this list, document users are cautioned that they must meet all specified requirements of documents cited in section 5 of this specification, whether or not they are listed.

2.2 Government documents. Not Applicable.

2.3 Non-Government publications.

International Maritime Organization (IMO) International Maritime Dangerous Goods Code (IMDG)

United Nations Recommendations on the Transport of Dangerous Goods Model Regulations

International Civil Aviation Organization (ICAO) Technical Instructions for the Safe Transport of Dangerous Goods by Air

2.4 Order of precedence. In the event of a conflict between the text of this document and the references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

## 3. REQUIREMENTS

3.1 Technical requirements. Ammunition shall meet the requirements and verifications of this specification for the non standard Shoulder fired and spin stabilized grenade ammunition listed in ANNEXES A and B. The non standard shoulder fired and spin stabilized grenade ammunition shall be comprised of a technical data package as defined in 6.3.2 of this specification.

3.1.1 Compliance to technical requirements and storage history records. Ammunition shall have evidence of compliance to the applicable Technical Data and records of documented storage history of ammunition.

3.1.2 Reduction or elimination of verification procedures. Sufficient evidence of compliance to technical requirements and acceptable storage history of ammunition as determined by SFAE-AMO-MAS-NSA may warrant reduction or elimination of verification procedures in TABLE I of this specification (see 6.2).

3.2 Conformance inspection. When specified, a sample of the ammunition shall be subjected to conformance inspection in accordance with 4.2, TABLE II, and ANNEXES A and B.

3.3. Serviceability. Ammunition shall be serviceable and issuable without qualification. All parts and assemblies shall be free of burrs, folds, chips, sharp edges, cracks, surface defects, dirt, grease, rust, corrosion products and other foreign material that may adversely affect fit or function. Ammunition shall be of good condition, without visible signs of degradation of ammunition or deterioration of packaging and all marking and stamping shall be neat and sharply defined.

3.3.1 Identification of defects. Defects inherent to the cartridge design and/or manufacturing processes shall be identified within the technical requirements and shall be classified as either a minor, major, or critical defect with a defined method for acceptance of the grenade ammunition.

3.4 Interface and interoperability requirements.

3.4.1 Weapon interface. The cartridge shall be functionally compatible with the weapons listed in ANNEX A. Weapon compatibility includes, but is not limited to, being fired from the grenade launcher specified in accordance with ANNEX A. Ammunition shall be loaded, chambered, fired, and extracted after firing without binding or causing damage to the weapon, and without cartridge induced malfunctions.

3.5 Operating requirements. Each cartridge shall provide the following functional, operational, and performance capabilities when fired from the weapons listed in ANNEX A without any additional ancillary devices, sighting systems, or modifications.

3.5.1 Operating temperatures. The grenades shall demonstrate the reliability/confidence throughout exposure to ambient and extreme temperatures.

3.5.2 Muzzle velocity. The average velocity obtained at ambient temperature testing shall meet the specified characteristics listed in ANNEX B.

3.5.3 Average maximum pressure. The average maximum pressure of the grenades fired shall meet the specified characteristics listed in ANNEX B.

3.5.4 Maximum effective range. The maximum effective range of the grenades shall meet the specified characteristics of Annex B.

3.5.5 Function and casualty. The grenades shall function without casualty or cause damage to weapon. Grenades shall exhibit a ballistic performance free of misfires, duds, premature bursts, short rounds, metal parts separation and early fuze function. The grenades shall cause no hazard or unsafe condition to the gunner during firing.

3.5.6 Fragmentation. The ammunition shall provide the lethal fragmentation at the desired radius for each item as identified in ANNEX B. (High Explosive/Fragmentation (HE/FRAG) Grenades only).

3.5.7 Dispersion. The grenades shall demonstrate dispersion characteristics as specified in the producer's technical data package .

3.5.8 Penetration. The grenades shall meet the rolled homogeneous armor (RHA) penetration characteristics as specified in ANNEX B. (High Explosive Anti-Tank (HEAT) Grenades Only)

3.5.9 Fuze type and description. The fuze shall be identified for the non-standard grenades in ANNEX A with a drawing / figure of the internal fuze design with components categorized and functional description and characteristics of the fuze that includes, at a minimum, operating temperatures, in-process tests (ie. jolt/jumble, sensitivity, safe arming/non-arming etc.), and safe separation distances.

3.6 Environmental requirements.

3.6.1 Shelf life. The grenades shall meet all requirements of this specification within its operating temperature range at a minimum of ten (10) years.

3.6.2 Sequential rough handling. Grenades shall be capable of withstanding the rigors of the sequential rough handling and transportation throughout extreme temperature ranges and meet all performance and safety requirements.

3.7 Support and Ownership requirements.

3.7.1 Packing. Packaging and packing shall be in accordance with section 5 of this specification or as otherwise specified in contract or purchase order.

3.7.2 Marking. Marking shall be in accordance with section 5 of this specification or as otherwise specified in contract or purchase order.

4. VERIFICATION

TABLE I. Requirement/verification cross-reference matrix

| Section 3 Requirements | | Method of Verification<br>1. Analysis<br>2. Demonstration<br>3. Examination<br>4. Test | | | | Classes of Verification<br>A – Basic Verification<br>B – Verification Procedures | | |
|---|---|---|---|---|---|---|---|---|
| Section 3 | Requirements | Verification Methods | | | | Verification Class | | Section 4 Verification Procedures |
| | | 1 | 2 | 3 | 4 | A | B | |
| 3.1 | Technical requirements | X | | | | X | | 4.1, TABLE II |
| 3.1.1 | Compliance to technical requirements and storage history records | X | | | | | X | 4.1.2, TABLE II |
| 3.2 | Conformance inspection | X | X | X | X | X | X | 4.1.2, TABLE II |
| 3.3 | Serviceability | | | X | X | | X | 4.3 |
| 3.3.1 | Identification of defects | X | | | | X | | 4.3 |
| 3.4.1 | Weapon interface | | X | | X | | X | 4.4.1 |
| 3.5.1 | Operating temperatures | | X | | X | | X | 4.5.1 |
| 3.5.2 | Muzzle velocity | | X | | X | | X | 4.5.2 |
| 3.5.3 | Average maximum pressure | | X | | X | | X | 4.5.3 |
| 3.5.4 | Maximum effective range | | X | | X | | X | 4.5.4 |
| 3.5.5 | Function and casualty | | X | | X | | | 4.5.5 |
| 3.5.6 | Fragmentation | | X | | X | | X | 4.5.6 |
| 3.5.7 | Dispersion | | X | | X | | X | 4.5.7 |
| 3.5.8 | Penetration | | X | | X | | X | 4.5.8 |
| 3.5.9 | Fuze type and description | | X | | | | X | 4.5.9 |
| 3.6.1 | Shelf life | X | | | | | X | 4.6.1 |
| 3.7.1 | Packing | | | X | | X | | 4.7.1 |
| 3.7.2 | Marking | | | X | | X | | 4.7.2 |

4.1 Technical verification. The ammunition may be subjected to verification of any or all requirements cited in section 3 in this specification, in accordance with the TABLE I. Noncompliance to any requirements shall be cause to withhold acceptance of the lot or batch in which the noncompliance was found.

4.1.1. Lot formation. The grenades shall be assembled into identifiable lots, sublots, or batches, or in such other manner as may be prescribed. Each lot or batch shall, as far as practicable, consist of units of product of a single type, grade, class, size, and composition, manufactured under essentially the same conditions, and at essentially the same time. The lots or batches shall be identified by the contractor and shall be kept intact in adequate and suitable storage space. The formation of lots or batches is desirable for reasons of homogeneity.

4.1.2 Conformance verification. The ammunition shall be subjected to verification in accordance with TABLE II below.

4.1.3 Conformance acceptance. Acceptance of grenades shall be based on compliance with verification in accordance with TABLE II of this specification. Failure to meet requirements of TABLE II shall be cause to withhold acceptance of lot or batch for which verification was performed.

TABLE II. Verification procedures and inspection

| Examination or Test | Requirement Paragraph | Inspection Method | Sample Size |
|---|---|---|---|
| Compliance to technical requirements and storage history records. | 3.1.1 | 4.2 | Annex A |
| Serviceability | 3.3 | 4.3 | See Note 1 |
| Identification of defects | 3.3.1 | 4.3 | See Note 1 |
| Operating temperatures | 3.5.1 | 4.5.1 | Annex A |
| Muzzle velocity | 3.5.2 | 4.5.2 | Annex A |
| Average maximum pressure | 3.5.3 | 4.5.3 | Annex A |
| Maximum effective range | 3.5.4 | 4.5.4 | Annex A |
| Function and Casualty | 3.5.5 | 4.5.5 | Annex A |
| Fragmentation | 3.5.6 | 4.5.6 | Annex A |
| Dispersion | 3.5.7 | 4.5.7 | Annex A |
| Penetration | 3.5.8 | 4.5.8 | Annex A |
| Fuze type and description | 3.5.9 | 4.5.9 | Annex A |
| Packing | 3.7.1 | 4.7.1 | 2 (See Note 2) |
| Marking | 3.7.2 | 4.7.2 | Annex A |
| Notes:<br>1 – To be performed using a defined sampling procedure for inspection determined on the grenades cartridge lot sizes<br>2 – 2 Units of Pallets, Packaging and unit pack will be inspected | | | |

4.2 Verification of evidence of compliance. Evidence shall include, but is not limited to, the following.

4.2.1 Identification of technical requirements to which the grenades is/was produced.

4.2.2 Producer, date of manufacture and original acceptance documentation.

4.2.3 Initial acceptance reports, including type, lot or batch identification, quantity and method of acceptance (e.g. sample size, verification method, acceptance criteria, results).

4.2.4 Surveillance reports, including lot or batch identification, quantity and method of surveillance (e.g. sample size, verification method, criteria for action to be taken on lot or batch, results).

4.2.5 Storage history, including duration and storage condition (e.g. controlled, uncontrolled).

4.3 Serviceability. A random sample shall be selected from the lot of grenades using a defined sampling procedure for inspection. The grenades shall be visually inspected for signs of degradation and the identification of defects indentified in the producer's technical data. Ammunition shall be of good condition, without visible signs of degradation of ammunition or deterioration of packaging.

4.4 Interface and interoperability requirements.

4.4.1 Weapon interface. A random sample shall be selected from the grenades to be delivered and inserted into a weapon chamber that conforms to the identified weapon system to check for profile and alignment. Inability to interface properly with weapon system shall be considered a failure to show compliance and constitute a single reliability failure.

4.5 Operating verification.

4.5.1 Operating temperatures. The grenades shall show evidence of performance when conditioned and fired throughout exposure to ambient and extreme temperatures.

4.5.2 Muzzle velocity. Velocity tests shall be conducted in accordance with producer's test procedure to verify that a sample representative of the lot meets the specified velocity requirements.

4.5.3 Average maximum pressure. Chamber pressure tests shall be conducted in accordance with the producer's test procedure to verify that a sample representative of the lot meets the specified chamber pressure requirements.

4.5.4 Maximum effective range. Maximum effective range tests shall be conducted in accordance with the producer's test procedure to verify that a sample representative of the lot meets the specified requirement.

4.5.5 Function and casualty. A random sample shall be selected from the grenades to be delivered and functioned from the identified weapon system to check for function, casualty and metal parts security. The inability to function without casualty, failure to exhibit proper ballistic performance or damage to caused to the weapon shall be considered a failure and constitute a single reliability failure.

4.5.6 Fragmentation. Fragmentation tests shall be conducted in accordance with the producer's test procedure to verify that a representative sample of the lot meets the specified requirement.

4.5.7 Dispersion. Dispersion tests shall be conducted in accordance with the producer's test procedure to verify that a representative sample of the lot meets the requirements identified within the producer's technical data package.

4.5.8 Penetration. Penetration tests shall be conducted in accordance with the producer's test procedure to verify that a sample representative of the lot meets the specified requirement indentified in ANNEX B.

4.5.9 Fuze type and description. A sample of the fuzes representative of the lot shall be tested in accordance with the producer's test procedure to verify the lot functions throughout the specified operating temperatures, safety distances, sensitivity and reliable function at the specified target range.

4.6 Environmental verification.

4.6.1 Shelf life. The cartridge shall show evidence of reliable performance over the estimated shelf life.

4.6.2 Sequential rough handling. The sequential rough handling tests shall be performed in accordance with producer's test procedures to verify ammunition and packaging will maintain performance and safety when exposed to the rough handling and temperatures consistent with transportation.

4.7 Support and ownership requirements.

4.7.1 Packing. A random sample of packaging and packing shall be selected from ammunition to be delivered and visually inspected for defects and compliance to requirements of section 5 of this specification.

4.7.2 Marking. A random sample of packaging and packing shall be selected from ammunition to be delivered and visually inspected for marking compliance to requirement of paragraph 6.4.5 in this specification.

## 5. PACKAGING

5.1 Preservation, packaging, packing, unitization, and marking shall provide protection for multiple handling, redistribution, and shipment by any transportation mode and meet or exceed the following requirements.

5.1.1 Packaging containers for hazardous materials, ammunition and explosives shall meet or exceed the requirements found in part 6 of the "United Nations Recommendations on the Transport of Dangerous Goods Model Regulations" and in a manner acceptable to the competent authority of the nation of origin and in accordance with the regulations of all applicable carriers.

5.1.2 Cleanliness - items and packaging shall be free of dirt and other contaminants which would contribute to the deterioration of the item or which would require cleaning by the customer prior to use. Coatings and preservatives applied to the item for protection are not considered contaminants.

5.1.3 Preservation - items susceptible to corrosion or deterioration shall be provided protection against external environmental effects.

5.1.4 Cushioning - items requiring protection from physical and mechanical damage (e.g. fragile, sensitive, critical material) or which could cause physical damage to other items, shall be protected by wrapping, cushioning, pack compartmentalization, or other means to mitigate shock and vibration and prevent damage during handling and shipment.

5.2. Unit Package

5.2.1 Unit package shall be so designed and constructed that it will contain the contents with no damage to the item(s), and with minimal damage to the unit pack during shipment and storage in the shipping container, and will allow subsequent handling. The outermost component of the unit package shall be a container such as a sealed bag, carton, or box.

5.3. Packing

5.3.1 Unit packages must be packed in shipping containers. All shipping containers shall be the most cost effective and shall be of the minimum cube to contain and protect the items.

5.3.2 Shipping Containers - the shipping container (including any necessary blocking, bracing, cushioning, or waterproofing) shall comply with the regulations of the carrier used and shall provide safe delivery to the destination at the lowest tariff cost. The shipping container shall be capable of multiple handling, stacking at least ten feet high, and storage under favorable conditions and meet the requirements of the “United Nations Recommendations on the Transport of Dangerous Goods”.

5.4. Unitization

5.4.1 Shipments of identical items going to the same destination shall be palletized if they have a total cubic displacement of 20 cubic feet or more unless skids or other forklift handling features are included on the containers. Pallet loads must be stable, and to the greatest extent possible, provide a level top for ease of stacking. The weight capacity of the pallet must be adequate for the load. A pallet load shall not exceed 4,000 pounds and should not exceed 52 inches in length or width, or 54 inches in height. The load shall be contained in a manner that will permit safe handling during shipment and storage. 5.4.2 Banding - metal banding shall be used to secure load. Straps shall be applied to each column or layer of boxes. Tie down straps shall be applied to each column of boxes at 90 degrees to the load straps. Edge protectors shall be used when securing fiberboard boxes.

5.5. Marking

5.5.1 Packaging marking shall be visible, clear, and remain legible during normal life cycle handling.

5.5.2 All unit packages, intermediate packs, exterior shipping containers, and, as applicable, unitized loads shall be marked with item description, quantity, lot number, or serial number. The outer shipping container and unitized load shall indicate load weight, UN dangerous goods proper shipping name, and UN number.

5.5.3 Each package shipping container shall show the United Nations packaging symbol and applicable codes in accordance with the construction requirements and testing of packaging as expressed in part 6 of the "United Nations Recommendations on the Transport of Dangerous Goods".

5.6. Additional Requirements for Hazardous Materials

5.6.1 The shipment shall be prepared in accordance with the "United Nations Recommendations on the Transport of Dangerous Goods" and other applicable regulations effective at the time of shipment in a manner acceptable to the competent authority of the nation of origin and in accordance with the regulations of all applicable carriers.

5.6.2 Packaging and marking for hazardous material shall comply with the requirements for the mode of transport and the applicable performance packaging contained in the following documents:

a. International air transport: International Civil Aviation Organization (ICAO) Technical Instructions for the Safe Transport of Dangerous Goods by Air

b. International vessel transport: International Maritime Organization (IMO) International Maritime Dangerous Goods Code (IMDG).

6. NOTES

(This section contains information of a general or explanatory nature that may be helpful, but is not mandatory.)

6.1 Acquisition requirements. Acquisition documents must specify the following:

a. Title and date of this specification.
b. Requirements for certificates of conformance for each lot or shipment of product.
c. Requirements for age of ammunition.
d. Requirements and provisions for submission of data as required.
e. Requirements for acceptance criteria if different than those stated in specification.
f. Requirements for reduction or elimination of verification procedures.
g. Requirements and provisions for contractor and Government verification.
h. Requirements and provisions for packaging of ammunition.
i. Requirements and provisions for transportation of ammunition.

6.2 Reduction or elimination of verification procedures. The contract or purchase order will state the minimum requirements for reduction or elimination of verification procedures. Ammunition produced within five (5) years of delivery with evidence of continuous controlled storage, evidence of conformance to and in accordance with applicable technical data that satisfy requirements of production verification of Table II of this specification may be reason to reduce or eliminate verification procedures of Table II of this specification.

6.3 Definitions.

6.3.1 Non Standard Shoulder Fired and Spin Stabilized Grenade Ammunition. Non standard Shoulder fired and spin stabilized grenade munitions are those munitions that have not been safety tested and type classified for Army use, cannot be procured through the Army supply. Munitions and explosives that are not managed by National Inventory Control Points, have not been safety tested nor type classified for Army use, do not have a national stock number (NSN) and cannot be procured or requisitioned through the Army or other Department of Defense supply system.

6.3.2 Technical Data. Technical Data is the product specific technical drawing and Quality Assurance (QA) requirements to which ammunition and associated packaging is produced and accepted for each applicable Contract Line Item Number (CLIN). For the purpose of this specification Technical Data, as a minimum, must contain the following: top assembly drawing with revision number, revision date, interface dimensions, and list of component assemblies; packaging and marking drawing with revision number, revision date, and markings; product specification with acceptance test methods with sample size, and accept/reject criteria.

6.3.3 Degradation. Ammunition with gross nonconformance to identified technical requirements, corrosion, cracks, deformation, and spillage.

6.3.4 Deterioration. Packaging ripped, broken, perforated, with water damage, crushed.

Preparing activity:
Army-AR

ANNEX A, Weapon Interface

| Spin Stabilized Grenades[2] | | |
|---|---|---|
| Item | Weapon Interface | Sample Size[1] |
| 40mm VOG-25 HE | GP 25/30 Grenade Launcher | 95/80 (e.g. 32-0-1) |
| 40mm VOG-25P HE Bounding | GP 25/30 Grenade Launcher | 95/80 (e.g. 32-0-1) |
| 40mm GRD-40 Smoke | GP 25/30 Grenade Launcher | 95/80 (e.g. 32-0-1) |
| Shoulder Fired Rocket Propelled Grenade[2] | | |
| Item | Weapon Interface | Sample Size[1] |
| 40mm OG-7V HE/FRAG Grenade | RPG-7 Grenade Launcher | 95/80 (e.g. 32-0-1) |
| PG-7VM 70.5mm HEAT | RPG-7 Grenade Launcher | 95/80 (e.g. 32-0-1) |
| PG-7VL 93mm HEAT | RPG-7 Grenade Launcher | 95/80 (e.g. 32-0-1) |

Notes:
1. Acceptance based on demonstration of reliability / confidence (example sampling plan provided in parenthesis sample size – accept – reject)
2. The non standard spin stabilized and shoulder fired grenades not listed in this table are required to meet the specified reliability/confidence.

ANNEX B
Operating Requirements

| Spin Stabilized Grenades[1] | | | | |
|---|---|---|---|---|
| Item | Muzzle Velocity (m/s) | Max. Average pressure (MPa) | Max. Effective Range (m) | Lethal Fragmentation Radius (m) |
| 40mm VOG-25 HE | ≥ 70 | ≤ 85 | ≥ 400 | > 5 |
| 40mm VOG-25P HE Bounding | ≥ 70 | ≤ 85 | ≥ 400 | > 5 |
| 40mm GRD-40 Smoke | ≥ 70 | ≤ 85 | ≥ 50 | N/A |

| Shoulder Fired Grenades[1] | | | | | |
|---|---|---|---|---|---|
| Item | Muzzle Velocity (m/s) | Max. Average pressure (MPa) | Max. Effective Range (m) | Lethal Fragmentation Radius (m) | Penetration[2] (mm) |
| 40mm OG-7V HE/FRAG | ≥ 145 | ≤ 95 | ≥ 950 | ≥ 22 | N/A |
| PG-7VM 70.5mm HEAT | ≥ 135 | ≤ 95 | ≥ 450 | N/A | > 400 |
| PG-7VL 93mm HEAT | ≥ 105 | ≤ 95 | ≥ 250 | N/A | > 200 |

Notes:

1. For grenades not meeting the technical requirements, requests for use must be submitted to SFAE-AMO-MAS-NSA for technical evaluation
2. Performance criteria shall be observed for penetration of rolled homogenous armor (RHA)